A look back at the successes of WISER 2

Description

As the second phase of the Weather and Climate Information Services for Africa (WISER) Programme comes to a close, Met Office WISER Programme Manager Kate Ferguson gives an overview of the achievements and learnings from the programme.

I first wrote a blog for the Weather and Climate Information Services for Africa (WISER) Programme just after I joined as Programme Manager back in January 2020. The landscape was very different then, we were mid-implementation with projects in full swing, pushing to reach their targets, and COVID-19 and all its complications was something yet to come our way.

Now WISER as we know it is closing its second phase, we have the chance to look back, not just to that more 'ordinary' time, but to where it all began. In 2015, a scoping study – CIASA – was carried out to provide a snapshot of the state of climate services in Africa and outlined gaps that could be addressed. From this, WISER was born. Phase 1 was delivered through 5 'quick start' projects, and these brief but intense projects formed the foundation, learning and direction that became WISER Phase 2.

There is no doubt that the ambition of WISER 2 was immense, with hugely ambitious targets to build on what was achieved through Phase 1, but also to scale that up to cover much of East Africa and grow to 12 projects – some of them with multi-million budgets, some working in extremely complex political and security context and some with much smaller budgets, testing out completely innovate approaches to reaching end users. At its heart, WISER strives to make a difference to millions of people across East Africa, by enhancing their resilience to weather and climate related shocks and improving regional economic development, which is something we are proud to be able to demonstrate.

Co-production is the foundation of WISER – bringing together the science and the end users of weather and climate information to enable better decision making. It's a huge achievement that the programme has reached 3.3m households with new or improved climate services as a result of this co-production approach. In addition, we now know that the programme has contributed over £200m of avoided losses across East Africa due to the use of climate information. We also know that a lot of the activities carried out have been sustained even after the funding period ended – which is the best legacy you can ask for.

The purpose of the HIGHWAY project was to deliver the provision of regular weather forecasts and severe weather warnings for fishing boats and small transport vessels on Lake Victoria.

As the programme draws to a close, we have naturally been making space to reflect on what has worked well and what could be improved in the future. A series of learning briefs have been produced, and a programme lesson and recommendation summary. There are too many to mention here, but a few key lessons identified across WISER are:

- Projects have a greater impact when they are aligned to national and regional development priorities, future deigns need to be based around and embedded within these to be complementary.
- Measuring the socio-economic benefit of a project is an extremely helpful tool to support National Meteorological and Hydrological Services to promote the value of taking a co-production approach and meeting the needs of their users, supporting them to secure future investment and national government budget allocations.
- Project and programme design needs to be gender-sensitive to be able to consider the inequalities within climate services, and adapt to meet the needs of the most vulnerable and have the greatest impact.

WISER has been the testing ground for many new and innovative project approaches and methodologies, with vast amounts of learning along the way. The aim now is to feed this learning into back into the weather and climate sector, to support future projects and programmes to build on the successes of WISER so far.

Between now and the end of 2021, we will produce a number of resources that can support this, and respond to the programme learnings with a revised, shorter more focused socio economic guidance, a programme level Gender Action Plan to support future project and programme design, a sustainability toolkit to assess what has been ‘left behind’ once funding ends, and of course, a new CIASA report, that will bring together all that has been achieved in the last 6 years, and provide direction for future interventions by identifying remaining gaps within the weather and climate sector in Sub-SaharanAfrica.

To find out more about the impacts of WISER as Phase 2 closes, read our news release here.

To find out more about the WISER programme, including the phase 1 and phase 2 projects and learnings, discover our webpages here.

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The feasibility of calculating an individual’s contribution to extreme weather events

Description

Climate change is making some forms of extreme weather events, such as heatwaves and heavy rainfall, more frequent and more intense.

Communities affected by those events inevitably suffer economic, social and societal impacts. The rising number of extreme weather events – and the losses and damages associated with them – poses a challenging question: who should pay?

This question is part of the so-called Loss and Damage agenda – which will be discussed at COP26 in Glasgow next month. Although the issue has been considered for some time there is currently no agreed method for calculating, apportioning liability or awarding such payments.

Fraser Lott is a Met Office scientist who has been developing scientific techniques to address this problem, in the hope of arriving at an objective solution.

Working with an international team of researchers, Fraser sought to show how the scientific capability of event attribution could be used to establish how individuals’ emissions affect extreme events through climate change. Fraser Lott said: “Event attribution is a climate science technique for calculating the likelihood that an extreme weather event was made more or less likely or severe because of climate change. By combining event attribution with population and emissions data, we realised that it was feasible to begin to calculate an individual’s contribution to a climate change event.”

It is believed to be the first time that anyone has attempted to express the impact of an individual’s emissions on an event based on event attribution: a scientific method of assessing to what extent an extreme event was influenced by individual human activity.

Aquaculture is an important economic sector in eastern China. Picture: Shutterstock

As a case study, this paper examined the impact of a 2018 heatwave in eastern China on the country's aquaculture industry, which lost 6.87 billion yuan (around £790 million) as a result of the event. Using data on historical emissions since 1991 – the date when the first international consensus on carbon emissions was reached with the publication of the IPCC's First Assessment Report – the team examined individuals from four representative nations (Sweden, China, Russia and the USA). The emissions of these countries were then divided equally among their population according to the number of years they had been over 18 (and therefore responsible adults) between 1991 and 2017, the year before the heatwave took place. Using this pioneering methodology, the potential cost to each individual could then be calculated, finding they were responsible for between 0.53 and 18.10 yuan of these aquaculture losses (around 6p to £2). This varied depending on the person's age and their country's emissions, showing how the scale of such responsibilities can be greatly affected by national development and demographics.

Fraser added: "As you'd expect with a newly-developed technique, our research doesn't provide an answer to every situation and there are further issues and challenges which subsequent research will need to address. We believe it is especially important that a broader range of experts such as philosophers, ethicists, policy experts and economists assist with the continued development of this emerging research."

The team noted that, if this technique were extended to cover multiple events, changes in the probabilities of events which did not occur because of climate change would also have to be factored into any cost calculation. Countries with weather which is difficult to simulate or with insufficient climate

observations would also present challenges when assuring any payment system was fair: there are established techniques which can counter these issues.

The issue of Loss and Damage is very broad and this research does not take full account of important aspects contributing to the costs of extreme weather events including the exposure of people to the hazards of extreme weather events or their vulnerability. The team also acknowledge that there are many demographic factors other than nationality and age which could influence an individual's contribution to extreme weather events.

Fraser added: "The preliminary approach in our paper has demonstrated that it's possible to calculate an individual's contribution by using the available climate and population data: how this develops will be a matter of discussion and debate by experts and the public."

The paper – Quantifying the contribution of an individual to making extreme weather events more likely – is published today (12 October, 2021) in the journal Environmental Research Letters

The research also involved the following authors:

- Andrew D King of the School of Geography, Earth and Atmospheric Sciences, University of Melbourne, Australia
- Simon F B Tett of the School of Geosciences, University of Edinburgh, Edinburgh, United Kingdom
- Dongqian Wang of the National Climate Center, China Meteorological Administration, Beijing, People's Republic of China
- Andrew Ciavarella, John J Kennedy and Peter A Stott of the Met Office

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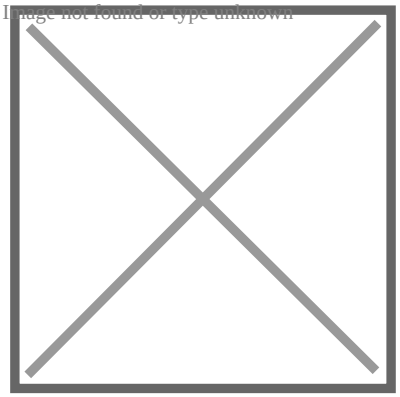


The solar cycle and space weather

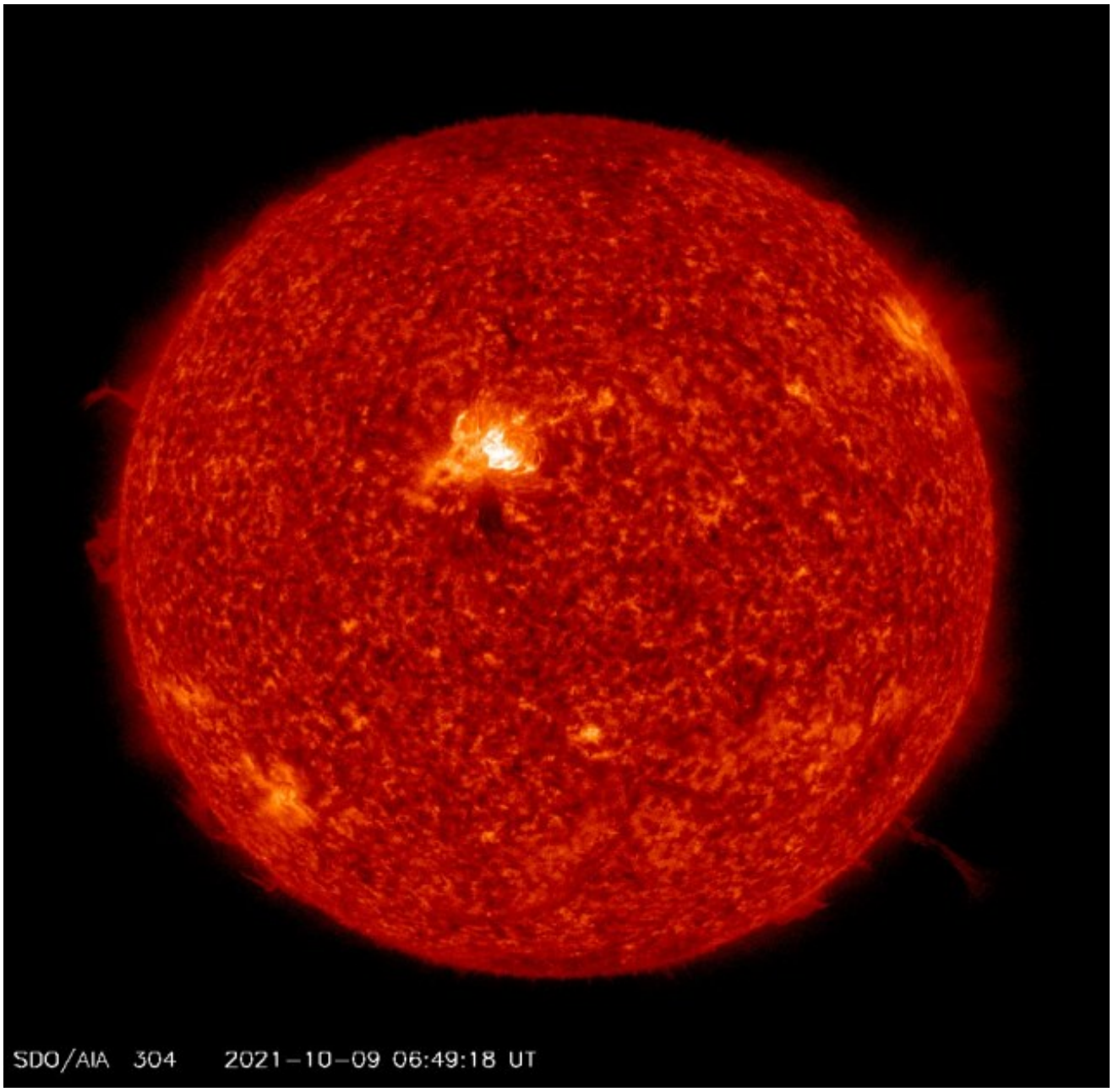
Description

You may have noticed solar flares, sun spots and coronal mass ejections have been in the news this week, following a space weather event which led to aurora borealis sightings in some northern parts of the UK between the cloudy weather. While the event itself was moderate, it does showcase the move to a new solar cycle, as ***Met Office Space Weather Forecaster Krista Hammond*** *explains in this blog.*

The number of sunspots visible on the sun varies over a roughly 11-year period from one peak to the next, known as the solar cycle. The peak in sunspot frequency is referred to as solar maximum, whilst the period during which we see the fewest sunspots is known as solar minimum.

Sunspots are areas of intensely concentrated magnetic field on the sun's surface. This causes them to be cooler than the surrounding area (the photosphere), and so they appear darker. Sunspots vary in magnetic complexity as well as size – the largest sunspot regions, often referred to as active regions, can be many times the size of the Earth.

Sunspots are important in space weather forecasting as they tend to be the origin of space weather phenomena that can have an impact at Earth, namely solar flares, solar radiation storms and coronal mass ejections (CMEs).



The Met Office Space Weather Operations Centre is monitoring the sun’s activity 365 days a year

Solar flares are sudden releases of energy across the entire electromagnetic spectrum. They are hard to predict, and the energy can be detected in Earth’s atmosphere as soon as 8.5 minutes after the occurrence of a solar flare. In association with large flares, solar radiation storms may also occur. These consist of high energy charged particles, predominantly electrons and protons, and typically take between 10 minutes and several hours to arrive at Earth.

A CME, also often associated with a flare, is the ejection of material from the sun into interplanetary space. If the material is directed towards the Earth then the event may result in a disturbance to the Earth's magnetic field and ionosphere. They can take days to reach Earth, carrying a local magnetic field from the Sun, and their arrival time is a key focus of space weather forecasting.

It follows then that since impactful space weather tends to originate from sunspots, the frequency of space weather events shows some correlation with the solar cycle. As we see an increase in the number of sunspots, we also expect to see an increase in space weather activity. The last solar minimum occurred in December 2019, with the next solar maximum expected around 2025. Over the coming years, as we continue towards solar maximum, we can expect to see an increase in the frequency of space weather events.

Space weather forecasting at the Met Office

The most recognisable and visible space weather effect is arguably the auroras (Northern and Southern Lights). The geomagnetic storm we have seen over the last few days that has been responsible for the aurora is nothing out of the ordinary, and aside from producing the northern lights will have very little impact on Earth. However, extreme space weather can have an impact upon our technology, national infrastructure, and communications systems. Luckily, these extreme events are very rare.

As we continue towards solar maximum, we can expect to see an increase in the number of space weather events of a similar magnitude to what we have seen this week. However, the most extreme events that can cause the largest impacts can take place at any point in the 11-year cycle. Therefore, space weather prediction is of crucial importance to many, including the government, satellite operators and the aviation industry, at any point in the solar cycle, day or night.

This is why the Met Office Space Weather Operations Centre provides 24/7 forecasts and warnings of space weather for Government and responder communities, critical national infrastructure providers and the public, to help them understand the risks and mitigate against the impacts.

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Colder than average conditions for the start of winter?

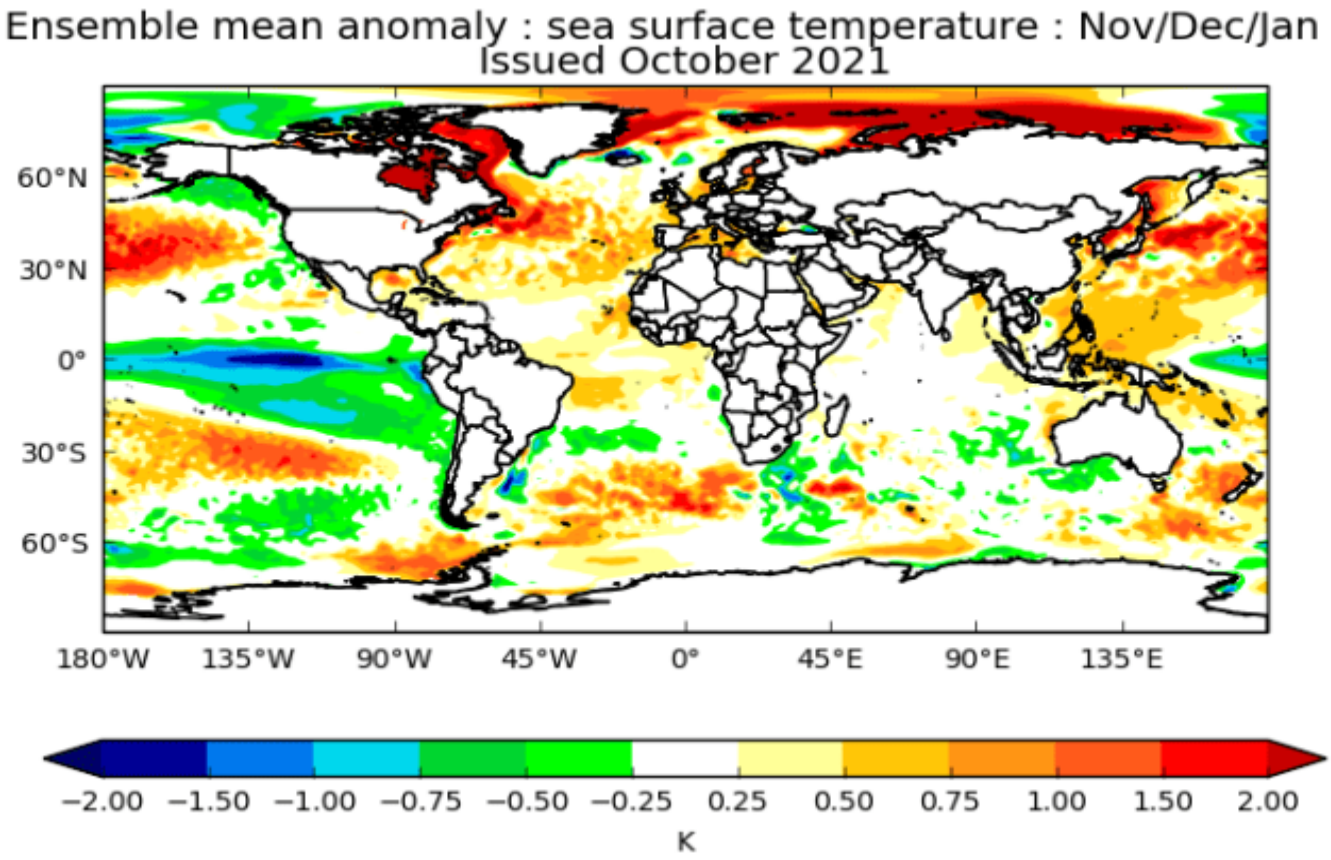
Description

In coming weeks you can expect to hear more in the media about the impacts on the UK's late autumn and winter weather emanating from La Niña: part of a pattern of climate variability in the tropical Pacific.

Seasoned climate watchers will be aware of ENSO (El Niño Southern Oscillation): a pattern of oceanic and atmospheric variability which – depending on the exact phase – can lead to a mild warming or cooling of the planet. Much of the time ENSO is in a so-called neutral state, but sometimes the variation becomes more extreme when we get a warmer El Niño, or cooler La Niña phase.

During La Niña, stronger than normal trade winds blow warm water towards the west Pacific causing an upwelling of cool water from the ocean depths in the east Pacific. This cools the tropical East Pacific and leads to variations in global weather.

La Niña conditions are now present in the tropical Pacific, and forecasters are suggesting these conditions will continue through the next few months.



La Niña doesn't just affect the tropical Pacific as it can even influence the Atlantic jet stream and our weather here in the UK. In early winter it is associated with Atlantic ridging and northwesterly winds

which is consistent with the current Met Office long range outlook. In late winter it is associated with westerly, milder and wetter conditions when compared to normal.

Professor Adam Scaife, Head of long-range forecasting at the Met Office, said: “La Niña has a profound effect on weather across the globe and can have impacts extending as far as the UK.

“In late autumn and early winter La Niña tends to lead to high pressure developing in the mid-Atlantic, which stops Atlantic weather systems from delivering mild air to the UK, and therefore can allow cold conditions to intensify. However, in late winter La Niña tends to drive a strengthening of the jet stream towards the Arctic increasing storminess and heavy rainfall, while bringing milder conditions to our sector.”

However, these conditions are not guaranteed. Last winter there was also a La Niña, but the impacts in the North East Atlantic strayed from usual. It is important to remember that the ENSO cycle is an important driver of global and UK weather, but other drivers, such as the Quasi-biennial Oscillation, can lead to differing conditions. The QBO is a regular variation of the winds that blow – either east or west – high above the equator.

Aidan MgGvern is a Met Office weather presenter. He explained: “This winter the QBO is in an easterly phase and there is an increased chance of a weakened jet stream across the Atlantic, making cold-weather effects on the UK more likely.”

The current 6-30-day outlook from the Met Office highlights the uncertainty around the impacts from global climate drivers on UK weather. Despite the La Niña and QBO impacts there is an emphasis on temperatures being generally near or above average for the rest of October, but there is a suggestion of a more settled and colder spell, with the threat of associated wintry hazards – such as frost and fog – becoming established later in the season.

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